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IS 11518 (1985): Determination of (the magnetization) coercivity in hardmetals [MTD 25: Powder Metallurgical Materials and Products]

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METHOD FOR DETERMINATION OF (THE MAGNETIZATION) COERCIVITY IN HARDMETALS

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Indian Standard

METHOD FOR DETERMINATION OF (THE MAGNETIZATION) COERCIVITY IN HARDMETALS

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Indian Standard

METHOD FOR DETERMINATION OF (THE MAGNETIZATION) COERCIVITY IN HARDMETALS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 November 1985, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 With the increasing use of hardmetals, a need has been felt to bring out standards on the method of tests for various properties of hardmetals. This standard is one of a series of Indian Standards on this subject. It is hoped that the formulation of this standard would be of considerable use to the industry.

0.3 In the preparation of this standard, assistance has been derived from ISO 3326-1975 'Hardmetals — Determination of (the magnetization) coercivity', issued by the International Organization for Standardization (ISO).

0.4 In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard specifies a method of determining (the magnetization) coercivity of hardmetals containing not less than 3 percent of a ferromagnetic binder by mass.

2. PRINCIPLE

2.1 A test piece is magnetized to technical saturation in a dc magnetic field. The complete demagnetization of the piece, due to reversal of the field, gives the coercivity H_{CM}, where $M = 0$.

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*Rules for rounding off numerical values (*revised*).

3. SYMBOLS AND DESIGNATIONS

3.1 The description of the various symbols are as given below:

Symbol	*Designation*	*Unit*
H	Magnetic field strength	kA/m
M	Magnetization of the test piece	kA/m
M_s	Magnetization at the technical saturation	kA/m
H_{CM}	(Magnetization) coercivity	kA/m

3.2 Coercivity H_{CM}, in kiloamperes per metre, as applied is the value of the reversed magnetic field required to reduce the intensity of magnetization in the test piece to zero (*see* Fig. 1).

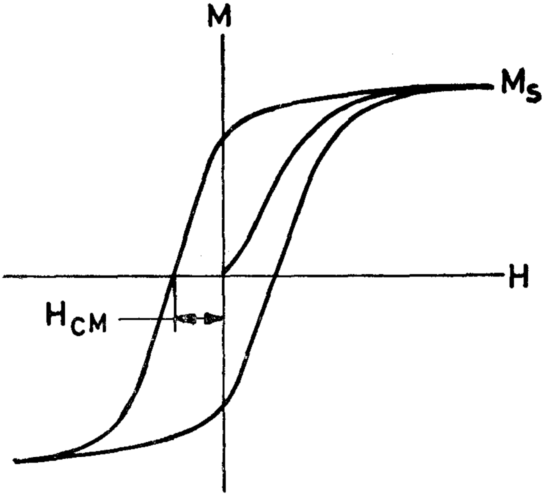

FIG. 1 CURVE SHOWING (MAGNETIZATION) COERCIVITY

4. APPARATUS

4.1 Apparatus capable of the dc magnetization of the test piece up to the state of technical saturation in the dc magnetic field and providing its demagnetization.

4.2 The apparatus shall have an accuracy of 0·2 kA/m for coercivity values up to 20 kA/m and 1 percent for values over 20 kA/m.

4.3 In order to reach technical saturation, the value of the magnetic field strength shall be 200 to 400 kA/m depending on the type of apparatus used.

5. PROCEDURE

5.1 Place the test piece in a dc magnetic field with its longest dimension in the direction of the field and magnetize it up to technical saturation.

5.2 Demagnetize the test piece in the dc magnetic field of reverse direction. The speed of demagnetization must be sufficiently low to give the accuracy specified in **4.2**.

5.3 Determine the coercivity H_{CM} necessary for demagnetization of the test piece.

NOTE — During the measurements disturbance of the magnetic field from metallic objects like trolley, chair, wrist watch, etc, close to the instruments should be considered and avoided.

6. TEST RESULTS

6.1 The result of the determination of coercivity H_{CM} shall be rounded to the nearest 0·1 kA/m.

7. TEST REPORT

7.1 The test report shall include the following information:

a) Reference to this standard,

b) Complete identification of the test sample,

c) The result obtained, and

d) Details of any occurence which may have affected the result.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Definition*
Force	newton	N	1 N $= 1$ kg.m/s^2
Energy	joule	J	1 J $= 1$ N.m
Power	watt	W	1 W $= 1$ J/s
Flux	weber	Wb	1 Wb $= 1$ V.s
Flux density	tesla	T	1 T $= 1$ Wb/m^2
Frequency	hertz	Hz	1 Hz $= 1$ c/s(s^{-1})
Electric conductance	siemens	S	1 S $= 1$ A/V
Electromotive force	volt	V	1 V $= 1$ W/A
Pressure, stress	pascal	Pa	1 Pa $= 1$ N/m^2